Risk Management Office's Respiratory Protection Training

AGENDA

The Regulations

Types of Respirators

Respiratory Program Element

Written Examination (RMO)

Fit Testing (RMO)

Regulations

This training applies to the requirement for the following

- General Industry, 29 CFR 1910.134
- NAVMAC Directive 5100.8 Para 13008
- Base Order 5100.13B

Regulations (cont.)

The employer **must** complete the following:

- Develop a **written program** with **worksite-specific procedures**
- Update program as necessary
- Designate a **program administrator** who is qualified

Regulations (cont.)

Everyone wearing a respirator **must** complete the following:

- Be trained on the use, wear, maintenance, and limitations of the respirator,
- Be medically qualified,
- Be fit tested

Regulations (cont.)

Employee responsibilities in respiratory protection are to:

- wear respirator when required,
- take good care of the respirator,
- inform supervisor of any problems with the equipment

Regulations (cont.)

Method of controlling respiratory hazards in the work place are:

- substituting with a less hazardous chemical,
- controlling the respiratory hazard by installing a ventilation system to capture or dilute the hazard,
- rotating workers in and out of the work area to reduce exposures,
- making workers wear respirators (the **least** preferred method).

Regulations (cont.)

Employer is **required** to provide the following:

- Hazard evaluation
- Medical evaluation
- Fit testing of tight-fitting respirators
- Training
- Periodic program evaluation

Regulations (cont.)

- Use feasible engineering controls
- When effective engineering controls are not feasible respirators shall be used pursuant to this standard
- Provide respirators, which are applicable
- Ensure establishment and maintenance of a **respirator program.**

Regulations (cont.)

- Policy on providing respirators at employee's request.
- Voluntary use is permissible.
- Must establish and implement the elements of a written program

Exception: Employers are not required to include in a written program employees whose only use of respirators involves voluntary use of filtering face pieces (dust masks).

Regulations (cont.)

Recordkeeping

The following records must be retained:

- Medical evaluations
- Fit testing results
- A written copy of the current program
- Written materials required to be retained

Type of Respirators (cont.)

Quarter Mask

Half Mask

Full Facepiece

Mouthpiece/Nose Clamp
(no fit test required)

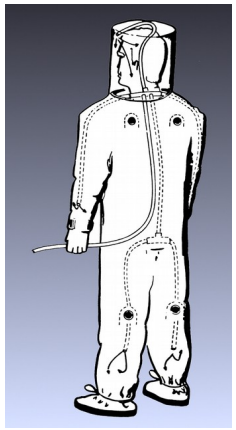
Tight -Fitting Coverings

Type of Respirators (cont.)

Hood

Helmet

Loose-Fitting Facepiece



Full Body Suit

Loose-Fitting Coverings

Type of Respirators (cont.)

A component used in respirators to remove solid or liquid aerosols from the inspired air. Also called **air purifying element**.

Filter

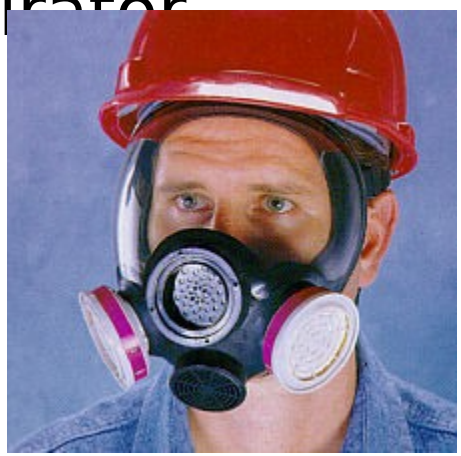
Type of Respirators (cont.)

A container with a filter, sorbent, or catalyst, or combination of these items, which removes specific contaminants from the air passed through the container.

Canister or Cartridge

Type of Respirators (cont.)

A respirator in which the air pressure inside the face piece is **negative during inhalation** with respect to the ambient air pressure outside the respirator.



Negative Pressure Respirator

Type of Respirators (cont.)

A negative pressure particulate respirator with a filter as an integral part of the face piece or with the entire face piece composed of the filtering medium.

Filtering Face piece (Dust Mask)

Type of Respirators (cont.)

A respirator with an air-purifying filter, cartridge, or canister that removes specific air contaminants by passing ambient air through the air-purifying element

Air-Purifying Respirator (APR)

Type of Respirators (cont.)

An air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Powered Air-Purifying Respirator (PAPR)

Type of Respirators (cont.)

A respirator in which the pressure inside the respiratory inlet covering exceeds the ambient air pressure outside the respirator.

Positive Pressure Respirator

Type of Respirators (cont.)

Atmosphere-Supplying Respirator

- A respirator that supplies the user with breathing air from a source independent of the ambient atmosphere
- Includes supplied-air respirators (SARs) and self-contained breathing apparatus (SCBA) units
- Require Grade (D) breathing air as described in the Compressed Gas Association Commodity Specification G7.1-136.6
- Alarms require monthly calibration

Type of Respirators (cont.)

Classes of Atmosphere-Supplying Respirators

- ***Continuous Flow*.** Provides a continuous flow of breathing air to the respiratory inlet covering

- ***Demand*.** Admits breathing air to the face piece only when a negative pressure is created inside the face piece by inhalation

- ***Pressure Demand*.** Admits breathing air to the face piece when the positive pressure inside the face piece is reduced by inhalation

Type of Respirators (cont.)

An atmosphere-supplying respirator for which the source of breathing air is not designed to be carried by the user. Also called **airline respirator**.

Supplied Air Respirator (SAR)

Type of Respirators (cont.)

An atmosphere-supplying respirator for which the breathing air source is designed to be carried by the user.

Self-Contained Breathing Apparatus (SCBA)

Type of Respirators (cont.)

A respirator intended to be used only for emergency exit.

Escape-Only Respirator

Type of Respirators (cont.)

Respiratory Inlet Covering

- That portion of a respirator that forms the protective barrier between the user's respiratory tract and an air-purifying device or breathing air source, or both

Respirator Program Elements

1. Selection
2. Medical evaluation
3. Fit testing
4. Use
5. Maintenance and care
6. Breathing air quality and use
7. Training
8. Program evaluation

Selection of Respirators

Employer must select and provide an appropriate respirator based on the respiratory hazards.

Selection of Respirators (cont'd)

- Select a **NIOSH-certified respirator.**
- Identify and evaluate the respiratory hazards in the workplace
- Where exposure cannot be identified, consider **Immediately Dangerous to Life or Health (IDLH)**
- Select respirators acceptable to, and correctly fits, the user

Selection of Respirators (cont'd)

Immediately Dangerous to Life or Health (IDLH)

An atmosphere that poses an immediate threat to life, would cause irreversible adverse health effects, or would impair an individual's ability to escape from a dangerous atmosphere.

Selection of Respirators (cont'd)

Oxygen Deficient Atmosphere

- An atmosphere with an oxygen content **below 19.5%** by volume
- All oxygen deficient atmospheres are considered IDLH

Selection of Respirators (cont'd)

Respirators for IDLH Atmospheres

Full Facepiece Pressure Demand SCBA certified by NIOSH for a minimum service life of 30 minutes

Combination Full Facepiece Pressure Demand SAR with Auxiliary Self-Contained Air Supply

Selection of Respirators (cont'd)

Respirators for IDLH Atmospheres (cont'd)

Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

Selection of Respirators (cont'd)

Assigned Protection Factor (APF)

The **workplace level** of respiratory protection that a respirator or class of respirators is expected to provide to employees when the employer implements a continuing, effective respiratory protection program as specified in this section.

Selection of Respirators (cont'd)

Assigned Protection Factors (APF's)

- Must use the APF's listed in **Table 1** to select a respirator that meets or exceeds the required level of protection

- When using a **combination respirator** (e.g., airline with an air-purifying filter), must ensure that the APF is **appropriate to the mode of operation** in which the respirator is being used

Selection of Respirators (cont'd)

TABLE 1 – ASSIGNED PROTECTION FACTORS[5]

Respirator Type[1, 2]	Quarter Mask	Half Mask	Full Face	Helmet/Hood	Loose-Fitting
Air Purifying	5	[3]10	50	----------	----------
PAPR	----------	50	1,000	[4]25/1,000	25
SAR					
▯ Demand	----------	10	50	----------	----------
▯ Continuous Flow	----------	50	1,000	[4]25/1,000	25
▯ Pressure Demand/ other (+) pressure	----------	50	1,000	----------	----------
SCBA					
▯ Demand	----------	10	50	50	----------
▯ Pressure Demand/ other (+) pressure	----------	----------	10,000	10,000	----------

[1]May use respirators assigned for higher concentrations in lower concentrations or when required use is independent of concentration.

[2]These APF's are only effective when employer has a continuing, effective respirator program per 1910.134.

[3]This APF category includes filtering facepieces and elastomeric facepieces.

[4]Must have manufacturer test evidence to support an APF of 1,000 or else these respirators receive an APF of 25.

[5]These APFs do not apply to escape-only respirators. Escape respirators must conform to 1910.134(d)(2)(ii) or OSHA's substance specific standards, if used with those substances.

Selection of Respirators (cont'd)

Maximum Use Concentration (MUC)

- The maximum atmospheric concentration of a hazardous substance from which an employee can be expected to be protected when wearing a respirator, and is determined by the **assigned protection factor** of the respirator or class of respirators and the **exposure limit** of the hazardous substance

- ***MUC = APF x OSHA Exposure Limit***[1]

Selection of Respirators (cont'd)

Maximum Use Concentration (MUC)

- Must select a respirator that maintains exposure to the hazardous substance, when measured outside the respirator, at or below the MUC
- Must not apply MUCs to conditions that are IDLH
- Set maximum MUC at lower limit if the calculated MUC exceeds the IDLH level

Selection of Respirators (cont'd)

Maximum Use Concentration Example

What is the MUC for an employee wearing a half-mask air purifying respirator (APF=10) in an atmosphere of sulfur dioxide gas (PEL=5 ppm)?

MUC = APF x OSHA Exposure Limit

MUC = 10 x 5 ppm = 50 ppm

Note that this calculated value does not exceed the IDLH level for sulfur dioxide (100 ppm), so that the MUC for this example would be 50 ppm.

Selection of Respirators (cont'd)

End-of-Service-Life Indicator (ESLI)

A system that warns the user of the approach of the **end of adequate respiratory protection**; e.g., the sorbent is approaching saturation or is no longer effective.

Selection of Respirators (cont'd)

Classes of Non-powered Air-Purifying Particulate Filters

Nine classes: three levels of filter efficiency, each with three categories of resistance to filter efficiency degradation due to the presence of oil aerosols

N	R	P
95	95	100
99	99	100
100	100	

N for *N*ot resistant to oil

R for *R*esistant to oil

P for oil *P*roof

Medical Evaluation Procedures

- Must provide a medical evaluation to determine employee's ability to use a respirator
- Must identify a PLHCP to perform medical evaluations
- Medical evaluation must obtain the information requested by the questionnaire in Sections 1 and 2, Part A of App. C
- Follow-up medical examination is required

Medical Evaluation

Additional Medical Evaluations

- **Annual review** of medical status is **not required**
- At a minimum, employer must provide additional medical evaluations if required by the standards

Fit Testing

Before an employee uses any respirator with a **negative or positive pressure tight-fitting face piece**, the employee must be fit tested with the same make, model, style, and size of respirator that will be used.

Qualitative Fit Test (QLFT)

A pass/fail fit test to assess the adequacy of respirator fit that relies on the individual's response to the test agent.

Quantitative Fit Test (QNFT)

An assessment of the adequacy of respirator fit by numerically measuring the amount of leakage into the respirator.

Fit Testing (cont'd)

- Employees using tight-fitting face piece respirators must pass an appropriate qualitative fit test (QLFT) or quantitative fit test (QNFT)

- Must conduct an additional fit test whenever the employee reports, or the employer or PLHCP makes visual observations of, changes in the employee's physical condition that could affect respirator fit

Fit Testing (cont'd)

- The fit test must be administered using an OSHA-accepted QLFT or QNFT protocol contained in Appendix A
  - QLFT Protocols:
    - Isoamyl acetate
    - Saccharin
    - Bitrex
    - Irritant smoke
  - QNFT Protocols:
    - Generated Aerosol (corn oil, salt, DEHP)
    - Condensation Nuclei Counter (PortaCount)
    - Controlled Negative Pressure (Dynatech FitTester 3000)
    - Controlled Negative Pressure (CNP) REDON

Fit Testing (cont'd)

Fit Factor

A quantitative estimate of the fit of a particular respirator to a specific individual, and typically estimates the ratio:

$$\frac{\textit{Concentration of a substance in ambient air}}{\textit{Concentration inside the respirator when worn}}$$

Fit Testing (cont'd)

- QLFT may only be used to fit test negative pressure APRs that must achieve a fit factor or 100 or less

- If the fit factor is determined to be equal to or greater than 100 for tight-fitting half face pieces or equal to or greater than 500 for tight-fitting full face pieces, the QNFT has been passed with that respirator

Use of Respirators
Facepiece Seal Protection

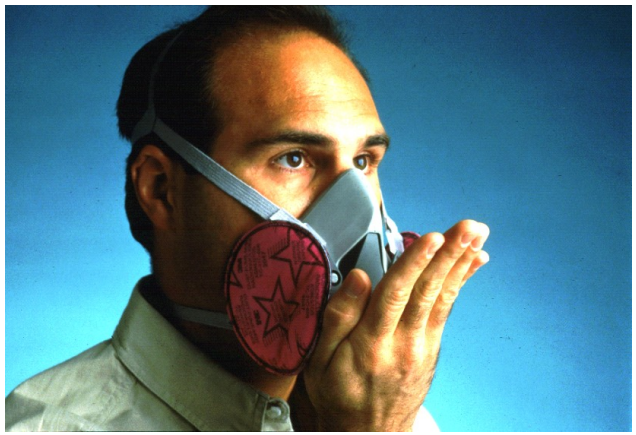
- Respirators with tight-fitting face pieces must not be worn by employees who have facial hair or any condition that interferes with the face-to-face piece seal or valve function

- Corrective glasses or goggles or other PPE must be worn in a manner that does not interfere with the face-to-face piece seal

- Employees wearing tight-fitting respirators must perform a user seal check **each time they put on the respirator** using the procedures in Appendix B-1 or equally effective manufacturer's procedures

User Seal Check

An action conducted by the respirator user to determine if the respirator is properly seated to the face.



Positive Pressure Check

Negative Pressure Check

Use of Respirators

Continuing Respirator Effectiveness

- Maintain appropriate surveillance of work area conditions and degree of exposure or stress; reevaluate the respirator's effectiveness when it may be affected by changes in these
- Employees must leave the respirator use area:
  - to wash their faces and respirator face pieces as necessary
  - if they detect vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece
  - to replace the respirator or filter, cartridge, or canister
- If employee detects vapor or gas breakthrough, changes in breathing resistance, or leakage of the face piece, employer must replace or repair the respirator before allowing employee to return to the work area

Use of Respirators

Procedures for IDLH Atmospheres

- One or more employee must be located outside the IDLH atmosphere
- Communication must be maintained
- Employees located outside must be trained and equipped
- Employer or authorized designee must be notified before entering
- Employer or authorized designee must provide necessary assistance

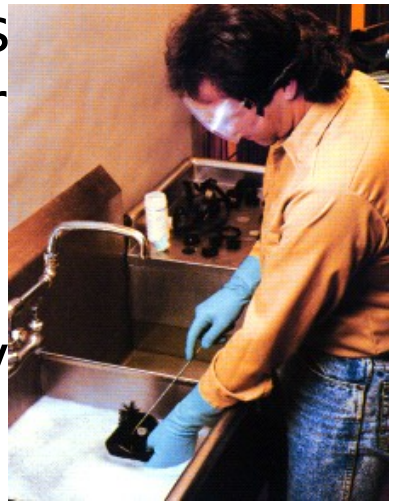
Use of Respirators

Procedures for IDLH Atmospheres (cont'd)

- Employees located outside the IDLH atmosphere must be equipped with:
  - a pressure demand or other positive pressure SCBA or SAR with auxiliary SCBA; and either
  - appropriate retrieval equipment for removing employees who enter, where retrieval equipment would contribute to the rescue of employees and would not increase the overall risk resulting from entry; or
  - equivalent means for rescue where retrieval equipment is not required per above

Maintenance and Care

- Provide each user with a respirator that is clean, sanitary and in good working order
- Use procedures on RMO WEBSITE or equivalent manufacturer's recommendati
- Clean and disinfect at the following interv
  - as often as necessary when issued for exclusive use
  - before being worn by different individuals when issued to more than one employee
  - after each use for emergency respirators and those used in fit testing and training



Breathing Air Quality and Use

- Compressed breathing air must meet at least the requirements for Type 1 - Grade D breathing air described in ANSI/CGA G-7.1-1989:
  - Oxygen content (v/v) of 19.5 - 23.5%
  - Hydrocarbon (condensed) content of 5 milligrams per cubic meter (mg/m^3) of air or less
  - CO content of 10 parts per million (ppm) or less
  - CO_2 content of 1,000 ppm or less
  - Lack of noticeable odor
- Compressors supplying breathing air to respirators must be equipped with suitable in-line air-purifying sorbent beds and filters that are maintained and replaced or refurbished per manufacturer's instructions

Breathing Air Quality and Use (cont'd)

- For compressors not oil lubricated, CO levels in the breathing air must not exceed 10 ppm
- For oil-lubricated compressors, a high-temperature or CO alarm, or both, must be used to monitor CO levels
  - if only high-temperature alarms are used, the air supply must be monitored at sufficient intervals to prevent CO levels from exceeding 10 ppm

Training and Information

Employers must provide effective training to employees who are required to use respirators.

Training and Information (cont'd)

- Employees who are required to use respirators must be trained such that they can demonstrate knowledge of at least:
  - why the respirator is necessary and how improper fit, use, or maintenance can compromise its protective effect
  - limitations and capabilities of the respirator
  - effective use in emergency situations
  - how to inspect, put on and remove, use and check the seals
  - maintenance and storage
  - recognition of medical signs and symptoms that may limit or prevent effective use
  - general requirements of the respiratory protection standard

Training and Information (cont'd)

- Training must be provided prior to use, unless acceptable training has been provided by another employer within the past 12 months
- Retraining is required annually, and when:
  - changes in the workplace or type of respirator render previous training obsolete
  - there are inadequacies in the employee's knowledge or use
  - any other situation arises in which retraining appears necessary
- The basic advisory information in Appendix D must be provided to employees who wear respirators when use is not required by this standard or by the employer

Program Evaluation

- Must conduct evaluations of the workplace as necessary to ensure effective implementation of the program
- Must regularly consult employees required to use respirators to assess their views on program effectiveness and to identify and correct any problems
  - factors to be assessed include, but are not limited to:
    - respirator fit (including effect on workplace performance)
    - appropriate selection
    - proper use
    - proper maintenance

Conclusion

- You now may schedule an appointment at the Risk Management Office (639-7049) to take a Written Exam & Fit Test. Please bring all appropriate medical documentation, equipment, and know at least the following:
  - why your respirator is necessary for use
  - limitations and capabilities of your respirator
  - effective use in emergency situations
  - recognition of medical signs and symptoms that may limit or prevent effective use
  - general requirements of the respiratory protection standard (29 CFR 1910.134)
- Anyone who fails the written examination (<80%) or fit test will not receive a respiratory protection certification card.